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Perception is a process by which simple and complex information (stimuli) is experienced. We gain information about how such stimulus inputs are experienced by a child, for example, by his responses or outputs. Outputs are in the form of vocalizations and motor acts. Thus, the perceptual process is frequently called perceptual-motor. But the concern is not only with inputs and outputs, but with what goes on in between. This process is cognition; that is, cognition is the process of the input being organized and processed within the mind for a response. Therefore, a perceptual-cognitive-motor (PCM) process is involved. The term "perceptual handicaps" refers to deviations in this process from the expected norms at a given age. Learning disabilities constitute the whole of which perceptual handicaps are a part. Perceptual handicaps do not necessarily indicate central nervous system damage; a deprived environment can affect the development of a child's perception, language, and cognition. Important to remedial PCM training procedures is the effective use of motivation to learn. Performance on tests and general behavior indexes should be considered in evaluation a child's PCM skills. (WD)

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# The Concept, "Perceptually Handicapped," Its Assets and Limitations[1,2]

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The concept, perceptually handicapped, is not an easy one to define since it is used broadly, narrowly or loosely and brings with it certain connotations that are unwarranted. That it is popular goes without saying. It is a name given to special classes in public schools for children with learning problems, and to children having learning difficulties. In this author's opinion this represents a popularity bias for a group of children and a problem area that is strikingly diverse in its composition, manifestations, and causation. Two further biases exist in relation to the term, perceptually handicapped, professional discipline bias (i.e. professions who prefer to view a complex problem from their discipline orientation only) and sampling bias (i.e. a particular group of children on which generalizations are made). While one can be critical of this overemphasis and unwarranted enthusiasm for the term, perceptually handicapped, there is another reaction which also constitutes a bias. Many professionals either ignore perceptual phenomena and their consequences or doubt their significance.

This presentation will attempt a clarification of what constitutes perceptual handicap and of the assets and limitations to the concept. In so doing the author has taken the position of a generalist rather than a specialist, presenting an overview rather than a narrower view in depth. No attempt has been made to review the burgeoning literature in this field, rather the emphasis is on a point of view which may have practical contributions.

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Perception is a process by which simple and complex information (stimuli) is experienced. Perception can be considered sensory information from the various modalities of vision, audition, touch, pain, body position, smell and taste. As far as academic learning is concerned, the primary modalities are audition, vision, touch, and proprioception. These can be referred to as inputs. However the only way we know about how stimuli are experienced are through responses which the child makes--their outputs. Inferences are made about inputs from the outputs. The outputs are in the forms of vocalization and motor acts, from the simple to the complex. This is why the perceptual process is frequently called perceptual-motor which more adequately describes what goes on. Also sensory stimuli are usually not simple so that they represent various combinations in different modalities such as auditory-visual or in the same modality such as patterns of stimuli, for example a series of sounds or a complex of sounds at the same time.

The process becomes more complex since one is not only concerned with inputs and outputs but what goes on between. This is where cognition comes in, i.e., thinking--how the input information is programmed, organized and processed within the mind for a response (concepts and styles). Again inferences are made about cognition from the responses children make--usually in connection with what kind of inputs. Sensory information has space and time considerations which are cognitive in character. Hence terms such as visual-spatial and auditory-temporal are used which imply that cognition exists. Piaget in particular (Flavell, 1963) has postulated a theory of cognitive development which clarifies the way in which a child perceives and responds to his environment.

Therefore one is dealing with perceptual-cognitive-motor processes.[4] Disorders can occur in these three aspects of the process, although it is difficult to clearly separate them from one another. Inferences can often be made from output responses as to what area is primarily involved.

Perceptual handicaps refer to deviations in perceptual-motor-cognitive processes from what are expected norms at a given age.[5] When one defines the process as perceptual-cognitive-motor, there are innumerable dimension possibilities that become available. There are many inputs, many outputs, and innumerable ways in which information or stimuli are organized and processed. Furthermore various combinations of these three aspects exist as well. Therefore, it is necessary to refer to what particular dimensions are being discussed.

While the growing body of information about perceptual-cognitive-motor processes is impressive, at the same time we need to be modest about what we don't know. Little is known about the manner and ways in which various combination dimensions develop or which ones are particularly crucial for learning. While there seems some truth to the proposition that handicaps in one or more dimensions have a relationship to academic learning (and probably other forms of learning as well), this is far from having been demonstrated by objective systematic study. Training programs that have been developed from tests designed to measure

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[4]It should also be stated that perceptual-cognitive-motor processes are not independent of emotional and instinctual life nor of child-environment interactions. The integration of perceptual cognitive processes with emotional and instinctual life is complex and beyond the scope of this paper.

[5]These are not clearly known nor are their variations.

some of these combination dimensions (Dubnoff, 1965; Frostig, 1964; ITPA, 1961; Kephart, 1960; 1965; Wepman, 1958) have yet to satisfactorily demonstrate that training in perceptual-cognitive-motor skill areas have generalizability and transferability to academic learning areas. What is more clearly demonstrated is an improvement of skills directly related to those skills being trained. A good example of this are the studies which have evaluated Delacato training procedures--which generally point to improvement in skills directly related to training procedures but not in skills that are presumed to be more distantly related. While one may be critical of the exaggerated claims and promises of Delacato and his group (Delacato, 1966) and of their theories, it is unfortunate in my opinion that studies which dispute their claims may have the consequences of derogating everything that is within their programs.

The assets and limitations to the concept, "perceptually handicapped children," can be depicted in a poem--"The Blind Men and the Elephant" (Saxe).[6]

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[6]

It was six men of Hindostan,
To learning much inclined,
Who went to see the elephant,
(Though all of them were blind):
That each by observation
Might satisfy his mind.

The first approached the Elephant,
And happening to fall
Against his broad and sturdy side,
At once began to bawl:
"Bless me, it seems the Elephant
Is very like a wall".

The other verses condensed are:

The second, feeling his tusk,
Thought he is like a spear - - -

The third, happening to take the trunk,
Thought the Elephant is like a snake - - -

The fourth, felt about the knee,
Thought he is very like a tree - - -

The fifth, chanced to touch the ear,
And thought the Elephant is like a fan - - -

The sixth, seizing on the swinging tail,
Cried the Elephant is like a rope - - -

The last verse goes as follows:

And so these men of Hindostan
Disputed loud and long,
Each in his own opinion
Exceedingly stiff and strong,
Though each was partly in the right
And all were in the wrong.

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Thinking of this poem as a parable, one can apply it to any number of complex phenomena that we wish to understand. In order to manage concepts that are complex, they are often reduced to simple parts that are not entirely accurate and can often be misleading. The phenomena presented in this paper are certain behaviors from tests and from other observations which are classified as perceptual handicaps that bear a relationship to problems in learning. Learning disabilities is the larger whole of which perceptual handicaps are a part. Like the blind men the tendency exists to describe a complex whole in terms of a part that is not entirely accurately perceived, or in terms of fragmenting parts, emphasizing one part somewhat in isolation from others. Unfortunately, the many professional disciplines who have had an interest in learning disabilities have tended to act as blind men focusing on those parts of the whole containing their bias and offering explanations that may be simple and biased as well.[7]

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[7]One can provide innumerable examples of oversimplified learning models, single explanations for complex behavior, inaccurate conclusions from research that is poorly designed, limited sampling of behaviors on which generalizations are made and uncritical thinking in the application of remedial methods to problems. These types of errors and mistakes were the basis of a paper by Benjamin (1961) entitled "Knowledge, Conviction, and Ignorance."

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It is of interest that people who have contributed to the concept of perceptual handicaps (Ayres, 1961; Bender, 1956; Benton, 1964; Cruickshank, 1967; Deutsch, 1963; Dubnoff, 1965; Dunn, 1959; Frostig, 1968; Goodenough, 1955; Kephart, 1960; Kirk, 1961; McCarthy, 1961; Wepman, 1958; and others) are modest about their findings and their limitations. Difficulties arise more from their disciples and followers or from those who selectively use their findings and capitalize on them for particular purposes. Frostig (1964) for example indicates that in her test battery of five areas of visual perception that she is only test sampling certain behaviors within those five categories. McCarthy and Kirk (1961) likewise state that they have limited their test battery to nine perceptual-motor areas which relate to language development while forty-eight areas would be possible from their theoretical model. Both groups indicate the incompleteness of the standardizations of the tests and do not draw conclusions that deviations from their norms are necessarily due to brain dysfunction or minimal brain damage.

Therefore one can state that <u>perceptual handicaps are only a part of the phenomenon of learning disabilities and do not merit the status of an entity or syndrome</u>. Perceptual skills of various kinds: such as figure ground differentiation (the ability to pick out a central figure from a background), form constancy (the same form in different sizes or colors) and sensory transformations (e.g. going from the auditory to the visual mode) appear to have some relationship to learning, but they are not the necessary and sufficient factors. Furthermore, their contribution is far from understood. We have as yet only partially understood some of these skills--what they are, of what basic elements they are composed, how they develop, how they interact with each other and with other factors.

Even when a skill can be defined we are not sure how it evolves in development through constitutional or innate equipment of the child that matures from biological forces or in interaction with the environment. It is more possible that these various skills arise as a consequence of complex interactions of innate equipment, maturation, early acquired patterns, and early or late environment experiences including informal or formal training. Therefore we are not justified in implying a simple etiologic connection between the degree of development of perceptual skills and central nervous system equipment. Benton (1962) has demonstrated that there is no simple one-to-one correlation between even clearly demonstrable neurological deficits and psychological behaviors. There is evidence that children at "biological risk" and "cultural risk" display more disturbance of the development of such skills when compared to other groups of children. "Biological risk" children are those with prematurity, complicated pregnancy, abnormality in the birth process, early neonatal distress, later severe illnesses, and head trauma. "Cultural risk" children are those who come from disadvantaged environments.

Environmental and family conditions strongly influence the patterns of development of the child's perception, language, and cognition which in turn effects his academic and psychological performance. Children from disadvantaged populations, particularly minority groups, show lacks in perceptual discrimination, sustained attention and communication with adults for information. The child is usually not verbally oriented, lacks experiences in instruction, information and correction, and does not anticipate rewards for tasks completed. Therefore, <u>perceptual handicaps do not necessarily indicate central nervous system damage</u>.

In our experiences with emotionally disturbed children of elementary school age at the Day Care Center of the University of Colorado Medical Center we have been impressed with the large number and variety of perceptual, motor, and cognitive problems they have demonstrated. While a number of these children have borderline electroencephalograms, equivocal neurological signs by examination, a history of risk births, and so called "organic" signs from psychological testing, we are reluctant to consider these children as having minimal brain damage. Rather the attempt is made to describe and define these perceptual, cognitive, and motor patterns so that individual and group psychoeducational programming can be developed for them. We do not view perceptual-cognitive-motor behaviors as simple and therefore approach them in a program of therapy for the child and his parents, therapeutic environment manipulation, academic programming, and remedial procedures of various kinds when they appear indicated and feasible.

Clinical experience indicates that remedial perceptual-cognitive-motor training procedures cannot be effectively used without considering motivational issues in the learning situation. This is too often taken for granted rather than being of central importance. Disturbed personal relationships between child and adult and behavioral management are central motivational issues. Because of disturbed relationships and poor self esteem handicapped children may not want to succeed. We usually think of success as a powerful reward and it often is so. However with poor self esteem a child accepts failure and apathy ensues. Furthermore social reinforcement of praise and encouragement from others may be ineffective or lacks concreteness. Concrete immediate rewards of tokens

and candy for successful completion may have more tangible meaning to handicapped children. These concrete rewards may make a bridge to social reinforcement so that it can in turn be more effective. Later competence and success can have positive self reward characteristics. Self teaching materials may also be used in those instances where relationship problems interfere with the teaching situation. Novelty and newness take on motivational characteristics so that techniques or paraphernalia may stimulate interest and achievement not only because of the rationale on which they are based but because of novelty value. Early feedback of information on performance (accountability) is also an important technique of motivation for handicapped children.

Therefore, one should be concerned about social and emotional aspects of the child together with the learning area. In our viewpoint the child is viewed as a matrix of developmental areas whose functioning is influenced by a large number of factors. This is why we and other workers employ the psychoeducational approach which embodies multifaceted understanding and interventions.

Therefore <u>perceptual, motor and cognitive problems are varied and are also only an aspect of the developmental matrix of the handicapped child</u>. One has to consider social and emotional aspects of development including such considerations in a psychoeducational treatment approach.

The detection of perceptual, cognitive and motor disorders in children does not only come from the use of particular psychological tests or a test battery. Behavioral observations in a variety of situations can provide information about stimulus boundedness, distractibility, short attention span, confused directionality, and other dimensions.

While the use of particular tests (Bender for visual motor perception, Frostig for visual perception, ITPA for linguistic abilities, Wepman for auditory discrimination, WISC for cognitive processes and other skills) are to be encouraged, one can become test bound, i.e. an exclusive focus on testing and its findings for diagnostic understanding and educational programming.

Keith, age six, who had learning difficulties along with symptoms of immature behavior and overly dependent reactions, can provide an illustrative example. On the Frostig test Keith demonstrated problems in figure-ground differentiation. However, when the psychologist[8] changed the nature of the embedded figures, Keith was able to differentiate figures from background in a number of instances. It was discovered that food items were clearly differentiated while items that were sharp pointed or serrated and knife-like presented difficulties. It appeared that the emotional symbolic meaning of the figure altered Keith's response. However, it was also possible that the discrimination of figures was of different complexity and nature, i.e. its particular configuration. Regardless of the explanation Keith could be programmed to differentiate figure-ground by starting with items that were relatively easier and successful for him. Gradually after experiencing success more difficult items could be introduced.

In this example the lack of exclusive reliance on test performance, rather the expansion of this performance led to discoveries of considerable usefulness. The aspects of his family environment and of his own emotional position which fostered dependency were a most important area for

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[8]Dr. Robert Cooke, personal communication

therapeutic intervention and environmental handling. It was our impression that dependency wishes influenced Keith's perceptual, cognitive and motor functioning.

Santostefano (1967) has developed a training program in visual focal attention based on studies of various types of mentally and emotionally handicapped children who displayed difficulty in sustained attention. By visual focal attention is meant the ability to maintain sustained attention on selected visual information or stimuli. It is Santostefano's contention that some of the perceptual training programs are based on higher developmental skill acquisition than is warranted for many children. He considers focal attention a more elementary skill that is basic to others. Santostefano calls attention to a problem which one frequently encounters. A test, and the program based on it, may be of higher order of complexity and often needs to be broken down into simpler elements.

While we have not used Santostefano's program specifically, we have observed that children who had a short attention span could be programmed within that span. As they experienced success in tasks programmed for that dimension, the children were able to slowly expand the time of their attention. This is what Cruickshank (1962) calls exploiting an inadequate behavioral style for adaptive purposes.

Other examples of instructing in accordance with maladaptive coping styles can be given. A negativistic child may be encouraged to devise non-usual and non-conforming ways of dealing with learning tasks. Once he has experienced success he may be interested in further easier success making use of usual more acceptable methods. An obsessional boy who checked

and rechecked what he was reading was assisted by having him read only a line and a half on a page. As he could do this readily, it was possible to gradually extend the number of lines until he could read an entire page. Certain phobic children have difficulties when new unfamiliar learning material is introduced. If this is programmed so that a child can temporarily regress back to familiar learning territory, he may be able to move ahead again.

Cooke and others have been impressed with a cognitive style dimension in children. This style is called reflective/impulsive and connotes a pattern of responding to cues and information. Children at the Day Care Center have the tendency to respond verbally and physically to information and to stimuli in a more immediate, quick manner. This has been labeled as an impulsive style. A listening program has been developed by Cooke and Parsons (1968) to train for reflective characteristics using interesting tasks and candy reinforcement to develop those characteristics of delay, associations, openness to other possibilities, and postponing direct answers to allow for the development of more extensive ideas about a topic being considered.

There are other behaviors within the cognitive, motor and perceptual areas in which the Day Care Center has been interested. One of them concerns psychomotor skills and strengths of various kinds--global and fine body movements, body image and laterality, and the body in relation to space and time. Guthals[9] has developed both group and individual programs for children based on his variations from the notions and applications of Kephart (1960, 1965) and the Geneva psychomotor education

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[9] Mr. Carl Guthals, personal communication

group of Naville (1966) and de Ajuriaguerra. Various psychomotor disorders which the child population at the Day Care Center demonstrate--problems in laterality, directionality, dissociation, and coordination--appear to have a relationship to how learning tasks are approached and performed.[10]

Therefore test behavior is only one source and at times a limited source of information about a child's perceptual, cognitive and motor skills. Behavioral observations in learning and non-academic situations also provide a rich source of information. Our knowledge is limited about the variety of perceptual, cognitive and motor skills that are involved in learning. At present no single test or battery of tests can capture them. While not discrediting tests, one needs to be aware of their limitations and of the continued importance of sensitive, curious, and careful observations. In particular, we should not just be interested in responses but also in how a child got to the responses, i.e. the process that went on within him. In this way, one can turn the test situation into an experiment, the goals of which are to find the conditions where a child can successfully master the task at hand. From such situations clues can be obtained for a remedial approach to that child.

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[10]However this is not a simple relationship in spite of general statements by Freud (1911), Piaget (Flavell, 1963) and Hebb (1949) to the effect that motor life and action life preceeds mental life or thinking life. Ayres (1961) states that much of the knowledge of the world begins with knowledge of one's own body. Number concepts have a body reference as do space concepts. However, there are children who manifest various psychomotor disorders that are highly efficient and effective learners. They may have deficiencies and difficulties in other areas of their development.

## Summary

This short presentation has been merely an introduction into the highly complex and fascinating area of perceptual-cognitive-motor handicaps in children. The concept, perceptually handicapped, has been defined as deviations from expected norms in perceptual-cognitive-motor behaviors. There are innumerable combination dimensions that can be defined but only a few of them have been partially clarified. However, perceptual handicaps are only a part of the phenomenon of learning disabilities and do not merit in my opinion the status of a syndrome or diagnostic entity. Perceptual handicaps do not necessarily indicate minimal brain damage which sometimes is claimed directly or implied. Perceptual-cognitive-motor processes are only an aspect, though an important one, of the developmental matrix of the child. Test behaviors and programs based on them provide only a limited source of information and of remediation possibilities for perceptual-cognitive-motor disabilities. The continued potentials of behavioral observation from other sources should not be minimized.

Recognizing the limitations and assets, one would hope that study, observation, experience and evaluation in the area of perceptual-cognitive-motor handicaps will continue without unwarranted claims. Furthermore this needs to involve the efforts of many professional disciplines who instead of being six blind men exploring the elephant can work collaboratively with clearer vision and a reflective cognitive style. Perhaps then --

If each of us is not blind
By observation might satisfy our mind
And each is partly in the right
And not all wrong for which we have to fight.

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